

TITLE: PYROLYTIC ORIGINS OF MAJOR GAS PHASE CONSTITUENTS OF CIGARETTE SMOKE

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ABSTRACT: During the smoking of cigarettes, we distinguish between three reaction zones. In the high temperature zone, atmospheric oxygen is primarily consumed during formation of CO and CO<sub>2</sub>. This leads to an oxygen-deficient pyrolysis-distillation zone in which H<sub>2</sub> and most of the water as well as acetone and acetaldehyde are generated by pyrolysis of tobacco constituents. This zone also generates organic gases, volatile N-heterocyclic hydrocarbons and hydrogen cyanide. The low temperature zone contributes little to the formation of gas phase constituents but rather to the diffusion of light gases into the environment while air, permeating the paper, enters the smoke stream. In determining the origin of cigarette smoke components, including gas phase constituents, the use of oxygen-18 and nitrogen-15 containing atmospheres and carbon-14 and nitrogen-15 labeled nonvolatile precursors had yielded the most meaningful data. This presentation will review the formation of CO, CO<sub>2</sub>, NH<sub>3</sub>, HCN, volatile aldehydes, nitrogen oxide, isoprene, and nitroalkanes in mainstream and sidestream smoke of cigarettes.

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